

WHAT IS CLAIMED IS:

1                   1.       A system for detecting signals, the system comprising:  
2                   a first antenna configured to receive at least a first input signal and generate at  
3 least a first received signal;  
4                   a second antenna configured to receive at least a second input signal and  
5 generate at least a second received signal;  
6                   a receiver system configured to receive at least the first received signal and the  
7 second received signal and generate at least a first output signal, a second output signal, a  
8 third output signal, and a fourth output signal;  
9                   a correlation system configured to receive at least the third output signal and  
10 the fourth output signal and generate at least a correlation signal;  
11                  a processing system configured to receive at least the correlation signal, the  
12 first output signal and the second output signal and estimate a cross correlated power level;  
13                  wherein  
14                   the first output signal is associated with at least amplitude information  
15 of the first received signal;  
16                   the second output signal is associated with at least amplitude  
17 information of the second received signal;  
18                   the third output signal is associated with at least phase information of  
19 the first received signal;  
20                   the fourth output signal is associated with at least phase information of  
21 the second received signal.

1                   2.       The system of claim 1 wherein the correlation system comprises  
2                   a first variable delay system configured to receive the third output signal;  
3                   a first down conversion system connected to the first variable delay system  
4 and configured to down convert a frequency of the third output signal;  
5                   a second variable delay system configured to receive the third down-converted  
6 output signal.

1                   3.       The system of claim 2 wherein the correlation system further  
2 comprises:  
3                   a third variable delay system configured to receive the fourth output signal;

4 a second down conversion system connected to the third variable delay system  
5 and configured to down convert a frequency of the fourth output signal;  
6 a fourth variable delay system configured to receive the fourth down-  
7 converted output signal.

1 4. The system of claim 3 wherein the first down conversion system  
2 comprises:  
3 a plurality of shift registers configured to receive at least a first datum, a  
4 second datum and a third datum respectively;  
5 a first summing system configured to receive at least a first datum multiplied  
6 by a first constant;  
7 a second summing system configured to receive at least a second datum  
8 multiplied by a second constant;  
9 wherein the third datum is free from transmission to the first summing system  
10 and the second summing system.

1 5. The system of claim 4 wherein the plurality of shift registers is further  
2 configured to receive at least a fourth datum and a fifth datum respectively, the fourth datum  
3 multiplied by a third constant and transmitted to the first summing system, the fifth datum  
4 multiplied by a fourth constant and transmitted to the second summing system.

1 6. The system of claim 5 wherein the first constant, the second constant,  
2 the third constant, and the fourth constant are each integers in power of two's.

1 7. The system of claim 5 wherein one of the first constant and the third  
2 constant is positive, the other of the first constant and the third constant is negative, one of  
3 the second constant and the fourth constant is positive, and the other of the second constant  
4 and the fourth constant is negative.

1 8. The system of claim 4 wherein the processing system is configured to  
2 estimate a cross correlation coefficient based on at least information associated with the  
3 correlation signal, and estimate a cross correlated power level based on at least information  
4 associated with the cross correlation coefficient, the first output signal, and the second output  
5 signal.

1                   9.       The system of claim 8 wherein the at least a correlation signal  
2 comprises an in-phase correlation signal, a quadrature-phase correlation signal, and a  
3 normalization signal.

1                   10.      The system of claim 1 wherein the first output signal is a first log-  
2 video signal, and the second output signal is a second log-video signal.

1                   11.      The system of claim 10 wherein the third output signal is a first  
2 intermediate frequency signal, and the fourth output signal is a second intermediate frequency  
3 signal.

1                   12.      A system for correlating signals, the system comprising:  
2 a receiver system configured to receive at least the first input signal and the  
3 second input signal and generate at least a first log-video signal, and a second log-video  
4 signal, a first intermediate frequency signal, and a second intermediate frequency signal;  
5 a correlation system configured to receive at least the first intermediate  
6 frequency signal and the second intermediate frequency signal and generate at least a  
7 correlation signal;  
8 a processing system configured to receive at least the correlation signal, the  
9 first log-video signal and the second log-video signal and estimate a cross correlated power  
10 level based on at least information associated with the correlation signal, the first log-video  
11 signal and the second log-video signal.

1                   13.      The system of claim 12 wherein the first log-video signal is associated  
2 with at least amplitude information of the first input signal, the second log-video signal is  
3 associated with at least amplitude information of the second input signal, the first  
4 intermediate frequency signal is associated with at least phase information of the first input  
5 signal, and the second intermediate frequency signal is associated with at least phase  
6 information of the second input signal.

1                   14.      The system of claim 12 wherein the correlation system comprises  
2 a first variable delay system configured to receive the first intermediate  
3 frequency signal;  
4 a first down conversion system connected to the first variable delay system  
5 and configured to down convert a frequency of the first intermediate frequency signal;

6                   a second variable delay system configured to receive the first down-converted  
7 intermediate frequency signal.

1                   15.     The system of claim 14 wherein the correlation system further  
2 comprises:

3                   a third variable delay system configured to receive the second intermediate  
4 frequency signal;

5                   a second down conversion system connected to the third variable delay system  
6 and configured to down convert a frequency of the second intermediate frequency signal;

7                   a fourth variable delay system configured to receive the second intermediate  
8 frequency signal.

1                   16.     The system of claim 12 wherein the first down conversion system  
2 comprises:

3                   a plurality of shift registers configured to receive at least a first datum, a  
4 second datum and a third datum respectively;

5                   a first summing system configured to receive at least a first datum multiplied  
6 by a first integer;

7                   a second summing system configured to receive at least a second datum  
8 multiplied by a second integer;

9                   wherein the third datum is free from transmission to the first summing system  
10 and the second summing system.

1                   17.     The system of claim 16 wherein the plurality of shift registers is further  
2 configured to receive at least a fourth datum and a fifth datum respectively, the fourth datum  
3 multiplied by a third integer and transmitted to the first summing system, the fifth datum  
4 multiplied by a fourth integer and transmitted to the second summing system.

1                   18.     The system of claim 12 wherein the processing system is configured to  
2 estimate a cross correlation coefficient based on at least information associated with the  
3 correlation signal, and estimate a cross correlated power level based on at least information  
4 associated with the cross correlation coefficient, the first log-video signal, and the second  
5 log-video signal.

1                    19.     The system of claim 18 wherein ~~the~~ at least a correlation signal  
2 comprises an in-phase correlation signal, a quadrature-phase correlation signal, and a  
3 normalization signal.

1                    20.     A method for detecting signals, the method comprising:  
2                    receiving a first input signal;  
3                    receiving a second input signal;  
4                    generating a first log-video signal, a second log-video signal, a first  
5 intermediate frequency signal, and a second intermediate frequency signal;  
6                    generating an in-phase correlation signal, a quadrature-phase correlation  
7 signal, and a normalization signal;  
8                    processing at least information associated with the in-phase correlation signal,  
9 the quadrature-phase correlation signal, the normalization signal, the first log-video signal,  
10 and the second log-video signal;  
11                    determining a cross correlated power level based on at least information  
12 associated with the in-phase correlation signal, the quadrature-phase correlation signal, the  
13 normalization signal, the first log-video signal, and the second log-video signal.

1                    21.     The method of claim 20 wherein the first log-video signal is associated  
2 with at least amplitude information of the first input signal, the second log-video signal is  
3 associated with at least amplitude information of the second input signal, the first  
4 intermediate frequency signal is associated with at least phase information of the first input  
5 signal, and the second intermediate frequency signal is associated with at least phase  
6 information of the second input signal.

1                    22.     The method of claim 20 wherein the generating an in-phase correlation  
2 signal, a quadrature-phase correlation signal, and a normalization signal comprises:  
3                    delaying the first intermediate frequency signal by a first time period;  
4                    down converting a frequency of the first intermediate frequency signal;  
5                    delaying the first down-converted intermediate frequency signal by a second  
6 time period.

1                    23.     The method of claim 22 wherein the generating an in-phase correlation  
2 signal, a quadrature-phase correlation signal, and a normalization signal further comprises:  
3                    delaying the second intermediate frequency signal by a third time period;

4 down converting a frequency of the second intermediate frequency signal;  
5 delaying the second down-converted intermediate frequency signal by a fourth  
6 time period.

1 24. The method of claim 22 wherein the down converting a frequency of  
2 the first intermediate frequency signal comprises:  
3 receiving at least a first datum, a second datum and a third datum;  
4 multiplying the first datum and a second datum by a first integer and a second  
5 integer respectively;  
6 transmitting the first multiplied datum and the second multiplied datum to a  
7 first summing system and a second summing system respectively;  
8 wherein the third datum is free from transmission to the first summing system  
9 and the second summing system.

1 25. The method of claim 24 wherein the down converting a frequency of  
2 the first intermediate frequency signal further comprises:  
3 receiving at least a third datum and a fourth datum;  
4 multiplying the third datum and the fourth datum by a third integer and a  
5 fourth integer respectively;  
6 transmitting the third multiplied datum and the fourth multiplied datum to the  
7 first summing system and the second summing system respectively;  
8 summing at least the multiplied first datum and the third multiplied datum;  
9 summing at least the multiplied second datum and the fourth multiplied datum.

1 26. The method of claim 20 wherein the determining a cross correlated  
2 power level comprises:  
3 determining a cross correlation coefficient based on at least information  
4 associated with the in-phase correlation signal, the quadrature-phase correlation signal, and  
5 the normalization signal;  
6 processing at least information associated with the cross correlation  
7 coefficient, the first log-video signal, and the second log-video signal;  
8 determining a cross correlated power level based on at least information  
9 associated with the cross correlation coefficient, the first log-video signal, and the second  
10 log-video signal.